

PART B -- EXPRESS TERMS

1. EXPRESS TERMS OF PROPOSED REGULATIONS -- Draft clear and specific proposed regulations
Use *ITALICS* to indicate California Amendment(s), use UNDERLINE to indicate addition(s), and use ~~STRIKEOUT~~ to indicate deletions.

See attached regulations.

Chapter 12-16-1 ENGINEERING REGULATION-QUALITY AND DESIGN OF THE MATERIALS OF CONSTRUCTION

STANDARD 12-16-1

CALIFORNIA STANDARD FOR EARTHQUAKE ACTUATED AUTOMATIC GAS SHUTOFF SYSTEMS (See Chapter 16, California Building Code and Chapter 12, California Plumbing Code.)

Division of the State Architect

Authority: Sections 19180-19183, Health and Safety Code

Reference: Section 19182, Health and Safety Code

Division I-CONSTRUCTION

Scope

Section 12-16-101

The American Society of Civil Engineers requirements for "Earthquake-Actuated Automatic Gas Shutoff Devices, ASCE 25-97(latest edition), shall be the applicable standard used by the Division of the State Architect for the certification of these devices.

- ~~—(a) This standard applies to earthquake actuated automatic gas shutoff systems (see Division IV, Definitions), hereinafter referred to as valves or systems, constructed entirely of new, unused parts and materials.~~
- ~~—(b) The valve or system shall be designed to operate automatically. Actuation of the gas shutoff means: may be accomplished either directly or indirectly by mechanical means or by other means.~~
- ~~—(c) This standard applies to valves having maximum operating gas pressure ratings of ¼ psi, 2 psi, 5 psi, or higher than 5 psi in 5 psi increments up to and including a maximum operating pressure of 60 psi.~~
- ~~—(d) This standard applies to valves which are to be mounted in the manufacturer's specified upright position or in one or more of the optional mounting positions selected by the manufacturer. [See Sec. 12-16-121 (a).] This standard applies to valves or systems intended for rigid mounting near the foundation of the structure to be protected, or in other suitable manner, so that the device will be subjected to the same seismic ground motion disturbance to which the protected structure is subjected.~~
- ~~—(e) This standard applies to valves which are capable of operation at ambient temperatures — 10°F to 150°F, unless a higher temperature, lower temperature, or both, are specified by the manufacturer. [See Sec. 12-16-121 (b).]~~
- ~~—(f) If a value for measurement as given in this standard is followed by an equivalent value in other units, the first stated value is to be regarded as the specification.~~

General

~~Sec. 12-16-102.~~

- ~~—(a) The construction of parts not covered by this standard shall be in accordance with equivalent concepts of safety, substantiality and durability.~~

~~All specifications as to construction set forth herein may be satisfied by the construction actually prescribed or such other construction as will provide at least equivalent performance.~~

General assembly shall be of a neat and workmanlike character with all parts well fitted.

- (b) The mechanisms of valves or systems shall be protected by substantial enclosures so as to prevent interference with the safe operation of the devices.
- (c) Pins, stems or other linkage passing through the valve body or casing shall be sealed to provide gas tight construction.
- (d) The valve or system shall require manual resetting after having been actuated.
- (e) The valve or system shall be so designed that after having closed, it will remain in the closed position with the valve rotated up to 45° from its normal operating position and when subjected to pressure surges up to 1½ times the rated operating pressure.
- (f) Each type of valve or system shall be certified as qualified for use, based on environmental tests as specified herein.

Equipment and Data to Be Furnished by the Manufacturer for Testing

~~Sec. 12-16-103.~~ The manufacturer shall furnish all necessary valves, systems and data for the use of the testing agency in testing devices under this standard.

- (a) Valves or systems.
- (b) Drawings, blueprints or photographs which describe each model of a valve or system.
- (c) Maximum operating pressure (in pounds per square inch and kPa). [See Sec. 12-16-101 (c).]
- (d) Capacity of valve with 1,000 Btu per cubic foot, 0.64 specific gravity gas at a pressure drop of 1.0 inch water column with an inlet pressure of 3 in. W.C.
- (e) Mounting classification. [See Sec. 12-16-121 (a).]
- (f) Operating ambient temperature range. [See Sec. 12-16-121 (b).]
- (g) Complete materials description.

Assembly

~~Sec. 12-16-104.~~

- (a) The construction of valves or systems shall be such that normally serviced parts cannot readily be improperly assembled.
- (b) If the valve or system is designed for field access to parts exposed to the gas stream for cleaning, access shall not require the use of special tools.

Connections

~~Sec. 12-16-105.~~

- (a) When pipe threads are used, connections shall be provided with cleanly cut taper pipe threads in accordance with the Standard for Pipe Threads (Except Dryseal), ANSI B2.1 1968.
- (b) Pipe thread length and length to shoulder dimensions shall not be less than shown in Table 12-16A.
- (c) A valve equipped with pipe or tubing threads shall be designed to accept a wrench for use in assembly and disassembly to piping.
- (d) Inlet and outlet gas connections shall be designed so that when a pipe which is threaded two threads beyond standard (for the size in question) is run into the threaded portion of a valve body, it shall not adversely affect the operation of the valve.
- (e) Connections for attachment to semi-rigid tubing shall comply with SAE specifications for automotive tube fittings as contained in the 1978 SAE Handbook.
- (f) Standard Range connections, when provided, shall be constructed in accordance with the dimensional specifications for 125 pound cast iron flanges in the Standard for Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800 ANSI B16.1 1975. (See Figure 12-16-1.)

Bolts, Nuts and Screws

~~Sec 12-16-106.~~ Bolts, nuts, screws and other threaded parts used in the covers, housing, casings and external mounting brackets shall have threads conforming to the Standard for Unified Inch Screw Threads (UN and UNR Thread Form), ANSI B1.1 1974, or metric threads of approximately the same strength and pitch.

Adjustments

~~Sec. 12-16-107.~~

- ~~—(a) Suitable means for maintaining all adjustments shall be provided. Lock nuts or adjusting nuts held by springs or compression will be considered satisfactory, except where their adjustment can be accidentally disturbed.~~
 - ~~—(b) Factory adjustment means: shall be sealed by means suitable for both continuous and intermittent exposure at the manufacturer's specified minimum and maximum operating temperatures.~~
- ~~Suitability of the sealing means: shall be judged before and after completion of all tests specified in this standard.~~

Materials

~~Sec. 12-16-108.~~

- ~~—(a) Materials for valves and mechanisms exposed to the gas stream shall be resistant to moisture, sulfur compounds, corrosion and the effects of fuel gases or shall be provided with protective coatings. Parts containing in excess of 65 percent copper exposed to fuel gas, other than cast or forged bodies, shall be protected from the effects of sulfur-bearing compounds.~~
- ~~—(b) Valve bodies and casings shall be of material having a melting point of not less than 800°F.~~
- ~~—(c) The manufacturer shall supply evidence that materials used in the exterior construction of the valve or system are resistant to deterioration from the following conditions or substances:~~
 - 1. ~~Moisture~~
 - 2. ~~Dirt and sand~~
 - 3. ~~Ozone~~
 - 4. ~~Fertilizers~~
 - 5. ~~Mineral and vegetable oils and grease~~
 - 6. ~~Common household chemicals likely to be used outdoors~~
 - 7. ~~Prolonged exposure to sunlight or heat~~
 - 8. ~~Prolonged exposure to freezing temperatures~~
 - 9. ~~Salt spray~~

Instructions

~~Sec. 12-16-109.~~ Each system shall be accompanied by printed instructions and diagrams adequate for its proper field assembly, installation and safe operation. These instructions shall be reviewed by the testing laboratory for accuracy and compatibility with results of tests and shall include the following:

- ~~—(a) The necessity for compliance with local codes or, in the absences of local codes, with the National Fuel Gas Code, ANSI Z223.1-1974, and Addenda, Z223.1-1978, and, if applicable, the National Electrical Code, ANSI/NFPA No. 70-1978.~~
- ~~—(b) Step-by-step inspection and installation procedures and methods.~~
- ~~—(c) The method for resetting the device.~~
- ~~—(d) Instructions as to how the device is to be located with respect to the related gas service, and other gas services, if applicable.~~
- ~~—(e) Clearances not less than those needed for testing and resetting, and provisions for access.~~
- ~~—(f) A description of how the system operates.~~
- ~~—(g) Instructions for examining the system for continued safe operation. These instructions shall indicate the necessity and minimum frequency for these examinations and shall also specify the periodic inspection of the system by a qualified service organization.~~

Marking

~~Sec. 12-16-110.~~

- ~~—(a) Marking material shall be identified by class number and shall meet the following specifications. All metal marking materials shall be corrosion resistant. All markings shall be suitable for application to surfaces upon which applied. The designation of any class of marking shall not preclude the use of a marking of a lower number class.~~

~~—Class I. Integral Marking~~ Marking that is embossed, cast, stamped or otherwise formed in the part.

~~—Class II. Permanent Plate~~ Shall be made of metal having a minimum thickness of 0.012 inch and shall be securely attached by mechanical means.

~~—Class IIIA-1. Permanent Label~~ Shall be made of material not adversely affected by water, shall be attached by means of nonwater-soluble adhesive and shall comply with Sec. 12-16-127. These materials shall not be located on surfaces having temperatures exceeding 300°F.

~~—Class IIIA-2. Permanent Label~~ Shall be made of material not adversely affected by water, shall be attached by means of nonwater-soluble adhesive and shall comply with Sec. 12-16-127. These materials shall not be located on surfaces having temperatures exceeding 175°F.

~~—Class IIIB-1. Waterproof Marking~~ Shall be printed directly on the part with waterproof marking not adversely affected by a temperature of 300°F. This marking shall not be used on surfaces having temperatures exceeding 300°F.

~~—Class IIIB-2. Waterproof Marking~~ Shall be printed directly on the part with waterproof marking not adversely affected by a temperature of 175°F. This marking shall not be used on surfaces having temperatures exceeding 175°F.

~~—Class IV. Semipermanent Label~~ Shall be made of material which may be soluble in water, and may use water-soluble adhesive for attachment means.

~~—Class V. Printed Marking~~ Marking shall be clear and prominent and may be applied directly by any printing means.

~~—Class VI. Attached Tags~~

~~—The above markings shall be legible following completion of the test specified in Sec. 12-16-121 or an equivalent period of time and temperature.~~

~~—(b) Each device shall be identified with a Class I or II marking material which shall denote the following:~~

- ~~—1. The manufacturer's name and city.~~
- ~~—2. The manufacturer's model number or other designation of the device.~~
- ~~—3. The pressure rating and direction of gas flow, if applicable.~~

~~—(c) Each valve or system shall bear a date code marking. This marking shall be Class I or II and shall consist of four consecutive digits determined as follows:~~

- ~~—1. The first two digits shall indicate the calendar year in which the valve was manufactured (e.g., 82 for 1982).~~
- ~~—2. Except as noted below, the last two digits shall indicate the week in which the device was manufactured (e.g., 03 for the third week of the year). For the purposes of this marking, a week shall begin at 0001 hours on Sunday and end at 2400 hours on Saturday.~~

~~—(d) A clearly legible warning shall be provided stating, "WARNING! This device must be installed in accordance with the manufacturer's installation instructions; if improperly installed, failure to function as intended or unwarranted interruption of gas service could result." This warning shall appear on a tag of Class VI marking material attached to the device and on Class V marking material on the carton in which the device is shipped.~~

~~—(e) Each device shall bear the symbol of the State of California certification indicating compliance with this standard in accordance with Title 21, Group 5, Section 1378.~~

Division II-PERFORMANCE

General

Sec. 12-16-121.

~~—(a) The tests specified herein shall be conducted with the valve mounted in the position(s) for which the valve is to be certified.~~

~~—(b) Unless otherwise specified, the tests specified herein shall be conducted while the device is at -10°F and 150°F.~~

~~—(c) Unless otherwise specified herein, either gas or air may be used for the tests.~~

Strength and Deformation

Sec. 12-16-122.

—(a) All parts of a valve subjected to gas pressure shall withstand a static pressure of five times the maximum rated operating pressure for the valve.

Method of Test

A separate valve not to be used for the conduct of other tests shall be tested. The inlet and outlet of the valve under test shall be connected to a suitable hydraulic system under room temperature conditions. The pressure shall be raised slowly to five times the manufacturer's specified rated pressure for the valve and held at the pressure for 1 minute.

There shall be no sign of rupture, cracks or mechanical dislocation of parts of the enclosure communicating with the atmosphere.

—(b) Valves shall be capable of withstanding, without deformation impairing valve operation, breakage or leakage, torque shown in Table 12-16B exerted by assembling to piping or tubing.

This test shall not apply to valves having flange connections.

Method of Test

This test shall be conducted at room temperature.

A wrench of suitable size shall be used to apply the torque. SAE 10 viscosity machine oil shall be applied to the taper threads of steel pipe nipples, which shall be inserted in the inlet and outlet of the valve and turned up handtight. With the inlet nipple secured in a vise, the specified torque shall be applied to the outlet nipple. For other than straight through type valves, the tests shall be repeated as outlined above except with the outlet nipple inserted in the vise and the torque applied to the inlet nipple.

Valves designed for tubing connections shall be tested as outlined above except that the torque shall be applied at opposite ends of the valve body through wrench flats or bosses and not to the tubing fittings. There shall be no evidence of deformation, cracks, breakage or impairment of operation as a result of making up inlet and outlet connections.

After relaxation of the applied torque, the valve shall meet the requirements for leakage specified in Sec. 12-16-123.

—(c) Valves shall be capable of withstanding the bending moments resulting from the static loads specified in Table 12-16C.

This test shall not apply to valves having tubing connections.

Method of Test

This test shall be conducted at room temperature.

The valve under test and suitable lengths of standard weight pipe of the same size as the valve connections shall be made up into a pressure tight assembly. The inlet and outlet pipes shall be connected to an air or gas pressure system capable of applying the test pressures specified in Sec. 12-16-123.

With the valve in the specified manufacturer's position, the outlet pipe shall be clamped as close to the valve as possible in a vise or other suitable rigid support. The appropriate static load specified in Table 12-16D shall then be applied to the inlet pipe as close to the valve as possible at a 90-degree angle from the direction of the outlet. If the inlet and outlet connections are of different sizes, the static load for the larger size shall be applied.

While subjected to this load, the valve shall be capable of being cycled open and closed 10 times, during which the valve shall be checked for external leakage and leakage through the valve as specified in Sec. 12-16-123 and shall not exceed the allowable leakage rates specified.

—(d) The valve or the valve component of the system shall be capable of withstanding impacts of 20 foot-pounds without cracking or breaking.

Method of Test

The valve or the valve component of the system under test shall be supported by securing it to a close pipe nipple of Schedule 80 (extra strong) pipe or a standard weight pipe coupling mounted on a rigid surface so that the free length of

the nipple or coupling is not greater than 1 inch. The outlet end of the valve shall be connected to a type of fitting for which designed. The test device shall be arranged so that the center line of contact, between the striking weight and the outlet side of the valve body, will be as far from the center line of the valve seat as the distance from the center line of the valve seat to the center of the wrench grip on the inlet connection. For a device having an outlet side shorter than the inlet, the center of impact shall be ¼ inch from the extreme outlet end.

The device shall then be struck four successive times at right angles to the longitudinal center line of the outlet gasway, with the device being turned 90 degrees between each impact. After each impact, the device shall be examined visually for cracks or breakage.

The test shall then be repeated on four additional valves.

A pendulum type impact machine is shown in Figure 12-16-2.

Leakage

Sec. 12-16-123.

—(a) Valves, when tested with air at both the minimum and maximum leakage test pressures specified in Table 12-16E, shall not leak externally at a rate in excess of 200 cubic centimeters (0.0071 cubic foot) per hour.

Method of Test

This test shall be conducted at both the minimum and maximum operating ambient temperatures [See Sec. 12-16.121(b)] and at the leakage test pressures specified in Table 12-16E.

Any bypass or other openings not essential to the operation of the valve during this test shall be sealed. The inlet(s) and outlet(s) of the valve shall be connected to a pneumatic system capable of supplying clean dry air at the specified range of leakage test pressures. Air shall be admitted slowly and maintained at the minimum specified leakage test pressure. Leakage, corrected to standard conditions of 30 inches mercury column and 60°F, shall be determined by a flow measuring device, capable of accurately indicating the allowable flow, located at the inlet of the air supply. This test shall be repeated at the maximum specified leakage test pressure.

—(b) Leakage of air through a valve in the closed position, assumed as the result of normal operation, shall not exceed a rate, corrected to standard conditions of 30 inches mercury column and 60°F equivalent to 2 cubic feet of propane gas per hour for valves having seal-off diameters of 1 inch or less, or of 2 cubic feet per hour per inch of seal-off diameter for valves having seal-off diameters of greater than 1 inch.

Method of Test

This test shall be conducted at both the manufacturer's specified minimum and maximum operating ambient temperatures [See Sec. 12-16.121 (b)] and at the leakage test pressures specified in Table 12-16E.

The inlet of the valve or control shall be connected to a pneumatic system capable of supplying clean dry air at the specified range of leakage test pressures. An airtight connection shall be made to the valve outlet, terminating in a flow measuring device capable of accurately indicating flow rates equal to the maximum permissible leakage, corrected to standard conditions of 30 inches mercury column and 60°F.

With the valve in the closed position, assumed as the result of normal operation, the leakage test pressure shall be applied to the valve inlet for a period of not less than 2 minutes. During this time, the flow measuring device shall not indicate a total leakage in excess of the maximum permitted, through the main valve seat.

Capacity

Sec. 12-16-124.

(a) The capacity of a valve shall not be less than that specified by the manufacturer.

This shall be determined by the quantity in Btu per hour (W) of a gas of 0.64 specific gravity and 1000 Btu per cubic foot which can be passed through the valve with the pressure drop specified in Table 12-16E.

Method of Test

This test shall be conducted with the valve at $77 \pm 10^\circ\text{F}$.

Standard weight pipe of proper size, reamed to remove burrs caused by cutting, shall be fitted to the inlet and outlet connections of the valve. When the valve is provided with semirigid tubing connections, fittings and semirigid tubing of the proper size, reamed to remove burrs caused by cutting, shall be used instead of standard weight pipe. The length of straight run of pipe before the inlet pressure tap shall not be less than 50 pipe diameters (I.D.), or in accordance with the principles established for pipe tap connections as presented in Orifice Metering of Natural Gas (Gas Measurement Committee Report No. 3, 1969) of the American Gas Association. The length of straight run of pipe between the valve and any downstream controlling means shall be 10 pipe diameters (I.D.). Two short lengths of pipe or metal tubing having a small diameter shall be securely attached to the pipe or semirigid tubing, one before the inlet and the other after the outlet connection. These pressure tapings shall be located 5 pipe diameters (I.D.) from the inlet and outlet connections. A drill shall be inserted in the short length of pipe or metal tubing and a hole drilled through the wall of the large pipe, care being taken to remove any burrs caused thereby. The two pressure tapings shall be connected to a differential pressure gage which may be read directly to at least 0.01 inch water column. The valve to be tested shall be placed in the manufacturer's specified position in the condition it naturally assumes when open.

A typical arrangement of the test apparatus is shown in Figure 12-16-3. The flow rate through the valve shall be adjusted to give an indication on the gages approximately equal to the pressure drop specified and with the inlet pressure maintained at the pressure specified in Table 12-16E, and the necessary observations made and recorded. Observations shall also be made at a number of different pressure drops.

For other gases, the capacity may be computed by the use of the following conversion factors:

AS (Btu per Cu. Ft.)	SPECIFIC GRAVITY	MULTIPLICATION FACTOR
500	0.6	0.516
800	0.7	0.765
2,500	1.53	1.62

The capacity shall be measured by means of a direct reading flow measuring device suitable for air, and selected so as to provide a reading of volumetric accuracy within ± 1 percent of the rated flow. Corrections shall be made to standard conditions of 60°F and 30 inches mercury column.

When the inlet and outlet connections of a valve differ in size, the observed pressure drop shall be corrected for the change in velocity pressure.

—(b) A valve shall be capable of shutting off while passing its specified capacity.

Method of Test

—With flow established at the pressure drop at which capacity is specified, as outlined in Sec. 12-16-124, the valve shall be caused to close by any convenient means and it shall be determined that full closure has been accomplished.

Response to Seismic Disturbance

~~Sec. 12-16-125.~~

—(a) The sensing means of the valve or system shall actuate the shutoff means within 5 seconds when subjected to a horizontal, sinusoidal oscillation having a peak acceleration of 0.3 g and a period of vibration of 0.4 second.

—(b) The sensing means of a valve or system shall not actuate the shutoff means when subjected for 5 seconds to horizontal, sinusoidal oscillations having:

- 1. A peak acceleration of 0.4 g with a period of vibration of 0.1 second;
- 2. A peak acceleration of 0.08 g with a period of vibration of 0.4 second; and
- 3. A peak acceleration of 0.08 g with a period of vibration of 1.0 second.

Method of Test

Each test shall be conducted on three samples of the valve or system. With the agreement of the manufacturer, all three samples may be tested simultaneously.

The valve or system shall be rigidly attached to a table or platform capable of being adjusted to provide the horizontal, sinusoidal, unidirectional accelerative forces necessary to conduct the tests described herein in its normal position of operation.

The valve or system shall be connected to a pneumatic system using inlet and outlet connectors that will not interfere with the motion of the platform. This pneumatic system shall be capable of being monitored to determine whether the device under test has been actuated to close the shutoff means.

The device under test shall be positioned as specified in the manufacturer's installation instructions so that the sensing means is in the manufacturer's specified upright position.

1. The table shall be adjusted to provide an oscillation period of the table of 0.4 second, and put into operation at a low table acceleration. This acceleration shall be increased slowly to 0.05 g, and maintained at that level for five seconds. The peak acceleration shall subsequently be slowly increased in increments of 0.05 g, and after each increment the peak acceleration shall be held constant for five seconds. The acceleration at which the device acts to close shall be recorded. The length of time at that level of acceleration shall also be recorded. The peak table acceleration at which the device acts to close shall not exceed 0.3 g, nor shall the device require more than five seconds to close at 0.3 g peak acceleration. This test shall be repeated three times with the device rotated in a horizontal plane on the table or platform to be at, respectively, 45, 90 and 135 degrees from the original position with respect to the direction of acceleration of the table. At the discretion of the testing agency, additional tests may be conducted at other horizontal orientations.

2. The series of four tests outlined in "a" above shall be repeated under each of the following conditions:

- A. At an oscillation period of vibration of 0.1 second and a peak acceleration of 0.4 g,
- B. At an oscillation period of vibration of 0.4 second and peak acceleration of 0.08 g, and
- C. At an oscillation period of vibration of 1.0 second and a peak acceleration of 0.08 g.

Under each of these conditions, the table or platform shall be put into motion and allowed to operate for a period of five seconds. During this period, the sensing means shall not signal the actuating means to act to close the shutoff means.

Continued Operation

~~Sec. 12-16-126.~~ The valve or system shall withstand 50 cycles of closing and being opened without any mechanical failure, impairment of operation or apparent damage while subjected to its normal operating pressure.

Method of Test

This test shall be conducted following the tests specified in Sec. 12-16-125. The valve or system shall be caused to close and then shall be reset 50 times using any means mutually satisfactory to the testing agency and the manufacturer.

The device shall then comply with Sec. 12-16-123 (a) and (b).

Marking Material Adhesion

~~Sec. 12-16-127.~~ The quality of adhesion of Class IIIA-1 and Class IIIA-2 marking materials (See Sec. 12-16-110) shall not be adversely affected when such marking materials are exposed to heat and moisture as specified in the following Method of Test.

Method of Test

These tests shall be conducted with the marking materials applied to the particular type of finish used on the valve or system in production. The panel shall be cleaned with a solvent and dried.

Half of the panel shall be wiped with a lightly oiled (medium machine oil, SAE-30) clean cloth. Samples of marking material shall be applied to the panel, one on the dry area and one on the oiled area. If the manufacturer supplies special application instructions, they shall be followed. Otherwise, test samples shall be applied with firm pressure and allowed to set for 24 hours. Adhesion shall then be checked by scraping across edges of the test sample plate with a metal blade (dulled knife blade or back of pocketknife blade) held at right angles to the test panel.

Samples shall then be placed in an oven for a period of two weeks with the oven temperature maintained at:

1. ~~350°F for Class IIIA-1 marking material, or~~
2. ~~250°F for Class IIIA-2 marking material.~~

Following the oven test, adhesion of the samples to the test panels shall be checked again as specified above.

Samples shall then be immersed in water for a period of 24 hours, after which adhesion shall be rechecked.

Good adhesion qualities shall be obtained under all of the above test conditions. Final acceptance of marking materials shall be based on the suitability of the application of the marking material to the device.

~~Division III-MANUFACTURING AND PRODUCTION TESTS~~

General

~~Sec. 12-16-128.~~ The manufacturer shall submit to the certifying agency a plan which is mutually acceptable to the manufacturer and the certifying agency and which describes the programs and test procedures specified in (a), (b) and (c) below and the records to be kept by the manufacturer.

~~—(a) Qualifying Materials.~~ The manufacturer shall use a program to qualify raw materials, parts, assemblies and purchased components.

~~—(b) Tests.~~ The manufacturer shall test each device covered by this standard for:

1. ~~Gas Leakage, as applicable~~
2. ~~Calibration, as applicable.~~

~~—(c) Schedule.~~ The manufacturer shall use a program which includes a mutually acceptable schedule(s) to conduct:

- ~~1. Capacity tests~~
- ~~2. Tests on shutoff at specified acceleration~~
- ~~3. Continued operation tests~~
- ~~4. Strength tests.~~

~~—(d) Correlation.~~ The manufacturer's test method (s) used shall be capable of relating back to the test(s) specified in the standard.

Division IV-DEFINITIONS

Actuating Means

~~Sec. 12-16-130.~~ A component of an earthquake actuated automatic gas shutoff system designed to react to a signal from a seismic sensing means and to act to close a gas shutoff means.

Certified

~~Sec. 12-16-131.~~ Means a verification issued by the State Architect that a specified earthquake sensitive gas shutoff valve has been tested and complies with this Standard.

Earthquake Actuated Gas Shutoff System

~~Sec. 12-16-132.~~ A system consisting of a seismic sensing means and actuating means designed to automatically actuate a companion gas shutoff means installed in a gas piping system in order to shut off the gas downstream of the location of the gas shutoff means in the event of a severe seismic disturbance. The system may consist of separable components or may incorporate all functions in a single body. This definition also refers to the term "earthquake sensitive gas shutoff valves" which term is synonymous.

Earthquake Valve

~~Sec. 12-16-133.~~ A valve for installation in a gas piping system and designed to automatically shut off the gas at the location of the valve in the event of a severe seismic disturbance.

Gas

~~Sec. 12-16-134.~~ Natural gas, manufactured gas, propane, butane and combinations of these.

Seismic Sensing Means

~~Sec. 12-16-135.~~ A component of an earthquake actuated automatic gas shutoff system designed to sense and respond to a seismic disturbance of specified intensity.

Shutoff Means, Gas

~~Sec. 12-16-136.~~ A valve of an earthquake actuated automatic gas shutoff system designed for installation in a gas piping system to shut off the gas at the valve.

Tested

~~Sec. 12-16-137.~~ Equipment or materials tested per this standard by a qualified testing laboratory.

TABLE 12-16A
MINIMUM THREAD LENGTH AND LENGTH TO SHOULDER
-Minimum Lengths, Inches

NOMINAL PIPE SIZE (Inches)	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
LENGTH OF THREAD ¹ (Inches)	0.43	0.50	0.58	0.67	0.70	0.75	0.92	0.98	1.08
LENGTH TO SHOULDER MALE THREAD ² (Inches)	0.7815	0.7935	0.9845	1.0085	1.0252	1.0582	1.5712	1.6337	1.7337
LENGTH TO SHOULDER FEMALE THREAD ³ (Inches)	0.6057	0.6247	0.7478	0.7678	0.7678	0.7838	1.0570	1.141	1.219

¹Use where threads are back relieved. (Reference: the Standard for Malleable-Iron Threaded Fittings, Class 150 and 300, ANSI B16.3-1977) ²Male threads = L₄ (overall length of male thread).

³Female thread = L₁ + L₃ + 1 pitch (L₁, L₃ and L₄ as specified in ANSI B2.1-1968).

TABLE 12-16B

NOMINAL OUTLET CONNECTION SIZE (Inches)	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
TORQUE (Inch-Pounds)	375	560	750	875	940	1190	1310	1310	1500

TABLE 12-16C

NOMINAL PIPE SIZE (Inches)	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
STATIC LOAD (Pounds)	20	22	25	30	35	45	70	100

TABLE 12-16D-LEAKAGE TEST PRESSURE

MAXIMUM PRESSURE RATING	LEAKAGE TEST PRESSURE	
	Minimum	Maximum
1/2 psi	2 in. w.e.	3/4 psi
2 psi	2 in. w.e.	3 psi
5 psi	2 in. w.e.	7.5 psi
Over 5 psi (in 5 psi increments to a max. of 60 psi)	1/4 psi	150% of max pressure rating

TABLE 12-16E-CAPACITY TEST PRESSURES AND PRESSURE DROPS

MAX PRESSURE DROP AT WHICH CAPACITY IS SPECIFIED	INLET TEST PRESSURE FOR DETERMINING CAPACITY
1.0 in. w.e.	3 in. w.e.

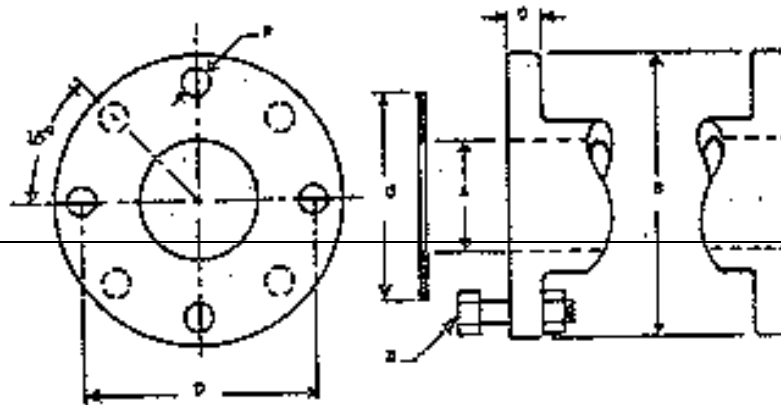


FIGURE 12-16-1—125-POUND CAST IRON PIPE FLANGE BODY CONNECTIONS

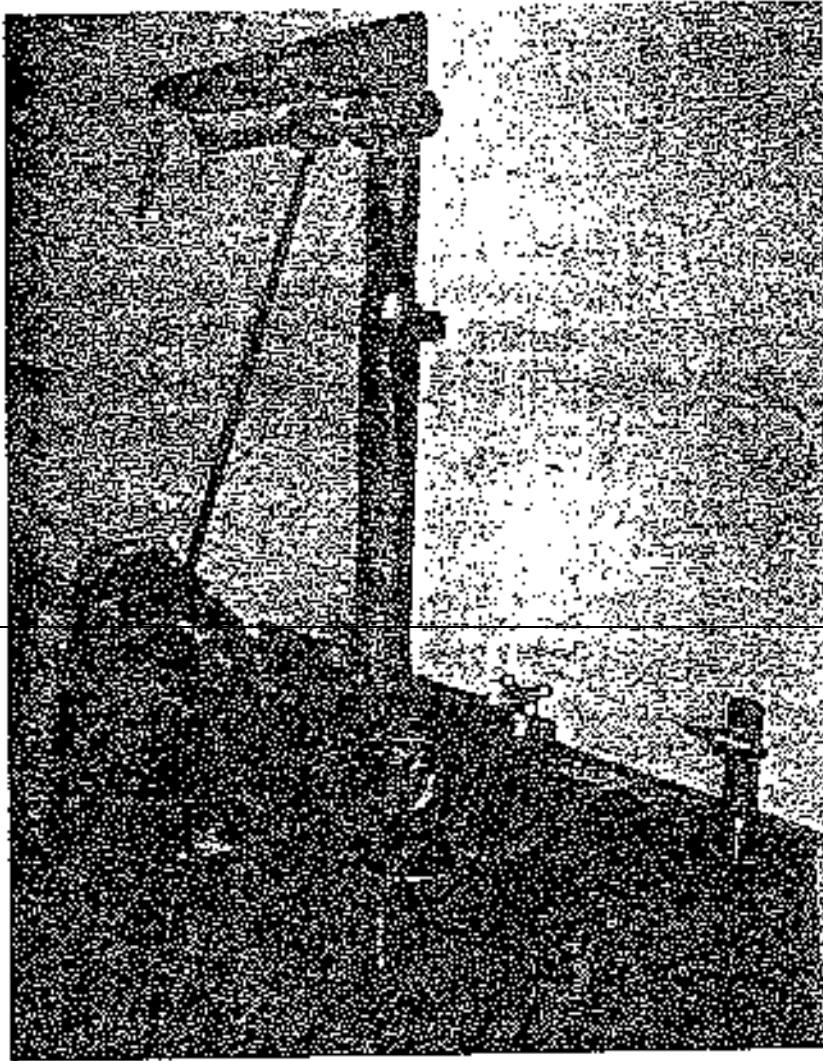


FIGURE 12-16-2—PENDULUM-TYPE IMPACT MACHINE
USED FOR TESTING VALVES

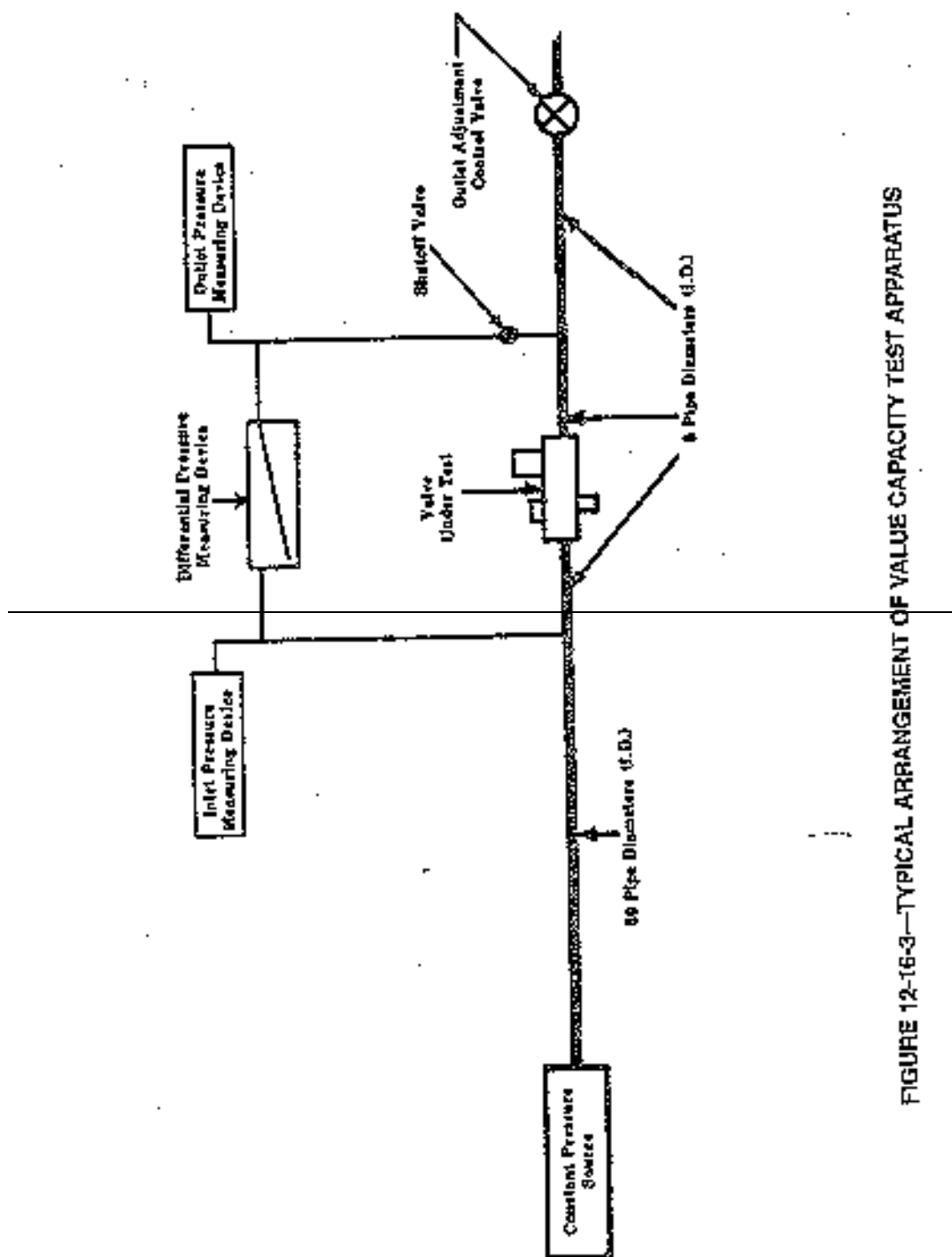


FIGURE 12-16-3—TYPICAL ARRANGEMENT OF VALVE CAPACITY TEST APPARATUS